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Acknowledgements

Hood et al 2002, Quantifying the benefits of additional channels of multifocal VEP recording: Increment function vs. radius

Computer screen at 36.5 cm distance. Stimulus diameter 29.5 cm resulting in diameter was 22.8°. MfVEP stimuli were presented on a 39.5×29.5 cm CRT Presentation®. Goggles’ visual field: 32°×24° / 800×600 Pixel. Stimulus outer via MRI-compatible goggles (VisuaStimDigital, Resonance Technology) by contrast-reversing rings and rotating wedges (classical retinotopic mapping), shown linear function (Fig. 3). For fMRI this led to Matlab-created sequences of expanding function in a novel way to obey cortical magnification as described by an inverse linear trend was removed, the spectrum obtained from a DFT, data above 40 Hz cut off, and data back-transformed to obtain the smoothed signal. S/N ratio in all the four subjects was good (Fig. 4).

• Stimuli designed to obey cortical magnification in a novel way.
• Stimuli precisely matched between mfVEP and fMRI.
• Stimuli to assess the impact of cortical folding on the mfVEP.

Introduction:
The folding of early visual cortex leads to visual-field-dependent signal cancellation and degraded S/N ratio in the VEP. We present a simple yet effective analysis technique for mfVEP data, based on a template signal obtained iteratively from signals with equalized polarity.

Methods:
Activity is Pearson’s correlation between local signal and template.
Borders of polarity reversal are seen as color change in these maps.

1. V1 and V2 folding by fMRI ring/wedge retinotopic mapping.
2. Stimuli precisely matched between mfVEP and fMRI.
3. Stimuli designed to obey cortical magnification in a novel way.
4. MfVEP activity maps and fMRI retinotopic maps juxtaposed for the same subject to assess the impact of cortical folding on the mfVEP.

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Stimuli:
Stimuli were designed to be directly comparable between mfVEP and fMRI by using the same ring radii which were constructed using an exponential function in a novel way to obey cortical magnification as described by an inverse linear function (Fig. 3). For fMRI this led to Matlab-generated sequences of expanding contrast-reversing rings and rotating wedges (classical retinotopic mapping), shown via-MRI-compatible goggles (VisuaStimDigital, Resonance Technology) by Presentation®. Draggles visual field: 32°×24° / 800×600 Pixel. Stimulus outer diameter was 22.8°. MfVEP stimuli were presented on a 39.5×29.5 cm CRT computer screen at 36.5 cm distance. Stimulus diameter was 22.8°. MfVEP stimuli were presented on a 39.5×29.5 cm CRT Presentation®. Goggles’ visual field: 32°×24° / 800×600 Pixel. Stimulus outer via MRI-compatible goggles (VisuaStimDigital, Resonance Technology) by contrast-reversing rings and rotating wedges (classical retinotopic mapping), shown linear function (Fig. 3). For fMRI this led to Matlab-created sequences of expanding function in a novel way to obey cortical magnification as described by an inverse linear trend was removed, the spectrum obtained from a DFT, data above 40 Hz cut off, and data back-transformed to obtain the smoothed signal. S/N ratio in all the four subjects was good (Fig. 4).

Conclusions:
The analysis approach allows for an automated evaluation of polarity patterns of the mfVEP resulting in a clear visualization of the respective patterns.

The impact of individual cortical folding on mfVEPs can be assessed in a straightforward manner.

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To highlight principles of signal cancellation, fMRI and mfVEP activation maps are juxtaposed. We considered in particular patches where activation maps show interesting deviations from the regular pattern.

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